

SPECTERM-64  
TELECOMMUNICATION SOFTWARE  
-----  
USER GUIDE AND TECHNICAL MANUAL

VERSION 4.0

*TS2068 w/emulation  
or  
Spectrum*

-----  
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## FIRST TIME USE of SPECTERM-64

First, we wish to thank you for selecting SPECTERM-64 as your choice in TELECOMMUNICATION SOFTWARE. You have made an excellent choice. SPECTERM-64 has features not available in any other terminal software package for the TIMEX/SINCLAIR 2068 Personal Computer. It can be used to connect the SPECTRUM emulated T/S2068 direct to a main computer or via any modem to "talk" to a Micro User or main computer over the telephone lines. It allows you to send and receive messages to bulletin boards and commercial databases. Some systems allow you to download or upload programs as well. SPECTERM-64 also allows you to transfer programs and data between yourself and other users. When the correct version of machine code is loaded (see OVERLAY LOADER section) it will work with most of the commercially available hardware based RS-232C interfaces and is unique in the fact that it can be customized to suit any others that appear.

Your SPECTERM-64 Software is recorded 'twice' on quality cassette tape and includes THIS user guide/technical manual. Side 'A' contains the 'SPECTERM-64 OVERLAY LOADER', 'SPTERM' machine code, and several I/F overlay files. Side 'B' contains two additional versions (WC2050, Z-SI/O) of the 'LOCAL CONTROL MENU'.

### USING THE SPECTERM-64 OVERLAY LOADER

Before continuing, configure your T/S2068 for SPECTRUM emulation. (SPECTERM-64 will operate with any SPECTRUM ROM, ROM-SWITCH or other 'emulator'.) Next, attach your desired communications interface following the manufacture's instructions.

Load the SPECTERM-64 OVERLAY LOADER program from side 'A' using the command; LOAD"". Be prepared to STOP the tape when prompted. Then type in the type of interface you are using. Press <ENTER> and start the tape to load the machine code and required overlay. The program will then stop at a 'LOCAL CONTROL MENU'. At this menu your options are:

1-SAVE COPY (This will SAVE a copy of SPECTERM-64 to a 'work tape' ready for use).

2-RUN (This will RUN SPECTERM-64.)

NOTE: DIAL PHONE and wait for 'tone' from the remote computer BEFORE pressing <ENTER> if using the 2050 Modem.

3-EXIT to BASIC

4-DISCONNECT (2050 modem only.)

Side 'B' of the tape contains two more examples of 'LOCAL CONTROL MENU's'. They give SPECTERM-64 additional capabilities such as changing 'parameters' and baud rates. Viewing/printing the buffer and buffer stats, etc. are examples of routines that can be tailored to your liking.

After SPECTERM-64 is configured for your interface, flip tape to side 'B' and LOAD "LOADER" (for Z-SI/O), or LOAD "LD2050" (for the 2050 Modem). Press 'BREAK' when program begins to run. Next, execute GOTO 1500 which will bring up the new 'LOCAL CONTROL MENU'. To make a copy of SPECTERM-64 with this menu, Exit to BASIC and enter GOTO 1000.

The BASIC area in SPECTERM-64 is approximately 7K in size. This area is available to use for any routines that you may want to include there. This concludes the installation procedures. As additional I/F overlays become available they will be posted on the TIME--<X>--CHANGE BBS (213) 329-3922 for downloading FREE OF CHARGE. SPECTERM-64 Public Domain files and On-Line support is available 24 Hours a Day here too.

#### RUNNING SPECTERM-64

When SPECTERM-64 runs, the introduction screen lists information about SPECTERM itself like the version and serial number, release date and copyright. Pressing the <ENTER> key again will place you in 'TERMINAL MODE'.

The prompt <<LCXRT>B at the top-right of the screen will indicate whether Line feeds (L) which are unnecessary with this program, Control characters (C) which are rejected by SPECTERM or an X-OFF (X) will illuminate if a CONTROL-S is sent by the remote computer to stop input while it does other things. It will go off when the computer returns to talk to you. The (R) and (T) indicate the Receive or Transmit mode.

To enter commands press the 'CAPS SHIFT' key and the '1' key together (EDIT). The 'RET,SPA, ,R,O,E,B,T,L,S,C' prompt will then appear at the top of the screen.

REMEMBER! ALL software commands MUST be in CAPITALS, so select UPPER case before using. Upper/Lower case characters can be selected by using the 'CAPS SHIFT' and '2' key (CAPS LOCK).

## SPECTERM COMMANDS and their functions:-

- E - Toggles between HALF and FULL DUPLEX (ECHO). This is normally OFF, as keyboard characters are echoed back by the database.
  - B - Stores all printed characters in the memory buffer, destroying any program already there. It can be turned ON and OFF at any time without destroying what TEXT has already been stored. When ON the "B" will flash at the top of the screen.
  - O - Will send a CODE file loaded from tape as if it came from the keyboard and stop on reaching a character with a CODE value greater than 127 (i.e. a graphic character).
  - L - Will load any tape from a cassette into the memory buffer ready for sending.
  - S - Will save the program in the memory buffer to tape as a BYTES file or BASIC file (depending on type). TEXT files can be saved this way also (see TEXT section). Remember to START tape BEFORE pressing 'S'.
  - T - Will send the program buffer to the database using XMODEM protocol. This is the system used by most bulletin boards as it allows error checking and the transfer of machine code as well as printable characters (ASCII).
  - R - Will receive a file into the memory buffer using XMODEM protocol as stated above. The 'R' will flash as blocks of data are transferred. Note: SPECTERM will not return to TERMINAL MODE unless a file has been successfully transferred. The only way to break out is to press the SPACE bar.
  - C - Will allow you to send a control character from A to Z by pressing the key required after the prompt at the top of the screen. CONTROL characters from 27 to 31 may be generated by using the keys 6 to 9. This includes the ESC character 27.
- ENTER Will return you to TERMINAL MODE from the function command menu. ('RET' is the <ENTER> key on the T/S2068.)
- SPACE Will allow you to return to BASIC after pressing key 'Y' at the question "RETURN TO BASIC?"

## HANDLING TEXT

Specterm 64 was written to allow the end user to configure the program to his (or her) specific needs. There are text handling capabilities built in to the software and others that can be added (into the basic area) if desired.

First, several of the functions at the main menu are usable for handling text files. You get to the main menu (from terminal mode) by pressing CAP SHIFT/ 1 (EDIT). Remember, ALL COMMANDS MUST BE ENTERED IN CAPS. UPPER/lower case can be toggled by using CAPS SHIFT/ 2 (CAPS LOCK). The commands usable with text are:

B: Toggles the buffer open/close. When opened the "B" in the main menu will flash and the buffer will capture all text printed on the screen (up to 31.487K). The buffer can be toggled without destroying previously stored text. Using the buffer to capture text will destroy any program already stored.

O: Will transmit a BYTES file that was loaded from tape as if it were being entered from the keyboard. Transmission will stop when the file comes to a character whose code is greater than 127 (any graphic). This function allows you to send a text file as ASCII, therefore you could create a file in Tasword II (ending it with a graphic character), load it into Specterm 64 upload it as ASCII.

L: Will load ANY tape (including Tasword II text files) from cassette into the Specterm 64 buffer, ready for sending.

S: Will SAVE the program or text file, downloaded into the buffer, to tape. The file will be save as a BYTES file or BASIC file automatically. If file is text (captured using an open buffer), the file will be saved to tape using the filename "TEXT.CODES". You must start your tape recorder BEFORE using the "S" command. Specterm 64 text files can be loaded directly into Tasword II for editing.

T: Will transmit any file (including text) in the buffer to a system that uses Xmodem protocol.

R: Will receive any file (including text) into the buffer from any system that uses Xmodem protocol. You should not save a text file downloaded this way with the "S" command. Save these files from Basic with the procedure outline below.

SPACE: Will allow you to return to Basic after pressing "Y" in response to "RETURN TO BASIC?".

ENTER: Press "Enter" to abort from main menu back into terminal mode.



The following are options that you may add into the Basic area of Specterm 64. They are very useful if you intend to do much text handling.

The addresses 32320, 32321, and 32322 should be POKEd with 0 if you don't want to reset (empty) the buffer upon entering (RAND USR 30806) the Specterm 64 terminal mode. These addresses are normally set at 34, 242, and 103 respectively.

Use `DEF FN P(X)= PEEK(X)+PEEK(X+1)*256` to make it easier to find the values of the 2 bytes needed for the addresses (X and X+1). If needed, see Spectrum or T/S2068 manual for explanation of the DEF FN and FN functions of the computer. These functions simplify the data handling (text included) and allow the use of non-supported peripherals (Disks, Microdrives, etc.) with Specterm 64.

After entering the above FN function, `FN P(30814)` is the buffer start address. `FN P(30816) - FN P(30814)` will give you the length of buffer used. Therefore to SAVE a text file, to tape, that was D/L with Xmodem (the "R" function), exit to Basic then use:  
`SAVE "<filename>"CODE FN P(30814),FN P(30816)- FN P(30814).`

To re-transmit a text file using the "O" command, that was downloaded with the "B" command (and not saved and reloaded from tape), `POKE FN P(30814),3.`

Any of these functions and many others could be added to the Basic area of Specterm 64. When you have designed YOUR favorite Basic area, upload it to the Specterm 64 support area on the TIME--<X>--CHANGE BBS (213-329-3922) to share with the other Specterm 64 users.

When SAVEing TASWORD files, TASWORD will give the length of the code saved, a note should be made of this value as it will be necessary to POKE this value as 'X' in the terminal program. This will allow TASWORD files to be sent as TEXT files, but no CR characters will be sent as TASWORD-II only inserts them upon printing a file.

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For users who run TASWORD-II on Microdrives....

To save a file to microdrive with CR's add the following to TASWORD-II's BASIC....

`251 INPUT T$:OPEN#3;"m";1;T$`

and to line 290 `CLOSE#3` before `GOTO 10`  
-----

#### AUTO CR/LF FUNCTION:-

SPECTERM is set for systems that allow only a Carriage Return (CR) that is not followed by the Line Feed character (LF). If however you wish to send a (LF) after each line (say for talking to another user) then you may POKE 33731,254 to enable this function.

MICRODRIVES, DISC DRIVES and storage other than cassette:-

DEF FN P(X)=PEEK(X)+PEEK(X+1)\*256 as FN P(X) gives the value of the two bytes making up the address. Addresses 32320, 32321 and 32322 should be POKE'd with 0. This stops the buffer from being reset on entering SPECTERM.

To LOAD code into the buffer use:

LOAD\*"m";1;"filename"CODE FN P(30814)

To SAVE code that is in the buffer use:

SAVE\*"m";1;"filename"CODE FN P(30814),FN P(30816)- FN P(30814)

These contain the start of the buffer after the keyword CODE and after the comma gives the length of the code.

#### SPECTERM TECHNICAL DATA

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These addresses are where SPECTERM jumps to when it communicates with the interface hardware (i.e. the 'overlay'). Data to be processed is in the 'A' (accumulator). All other registers are preserved. If writing a routine for your own interface you would use these as the start address for these routines. If more room is needed you can place 'jump/ret' instructions here to another portion of memory. But do not make your routines too long or characters may be lost at high speed due to processing time. The address at 'INIT' is run on entering SPECTERM and initializes the interface.

INPUT	33872	+5 Bytes
OUTPUT	33889	+5 Bytes
RX/STAT	33877	+6 Bytes
TX/STAT	33883	+6 Bytes
INIT	33894	<-- length depends on hardware used.

LAST available ADDRESS= 34047 Buffer start= 34048  
Specterm-64 CODE START= 30806 LENGTH= 3242

POKES FOR "WC2050" and "2050zx" and "Z-SI/O" overlays....

Interface overlays 'default' to 8/1/none and MUST be 8/1/none for XMODEM transfers.

33911,111	=	8/1/none	at	300	baud
33911,123	=	7/1/even	at	300	baud
33911,110	=	8/1/none	at	1200	baud
33911,122	=	7/1/even	at	1200	baud
33911,74	=	7/1/odd	at	1200	baud
33911,75	=	7/1/odd	at	300	baud
33911,62	=	8/2/none	at	1200	baud
33911,63	=	8/2/none	at	300	baud

## HINTS & KINKS for SPECTERM-64

If you have never used 'XMODEM' or 'KMD' for file transfers before here is a quick how-to with SPECTERM-64....

Most Bulletin Board Systems (BBS) have facilities for the transfer of 'binary' files. The most widely used 'protocol' is called XMODEM. Another "new" version is called KMD but it too uses XMODEM protocol for file transfer. The only differences between the XMODEM and KMD programs is that KMD allows 'bulk' file transfers. To initiate a transfer with KMD or XMODEM and SPECTERM-64 simply do the following:

On 'RCP/M' systems (and this covers 90% of the systems you will find) after you have gained access to the CP/M system you will see a CP/M command prompt that will look like this:

AO>\_ (the underline '\_' is your cursor.)

To SEND (upload) a file TO this system FROM your computer you would enter:

XMODEM RC FILENAME.TYP (Then hit <ENTER>)

The 'R' tells XMODEM to RECEIVE, the 'C' tells XMODEM that you are using 'CHECKSUM' protocol (XMODEM uses two types of protocols, CRC which is 'Cyclic Redundancy Check' and 'CHECKSUM' SPECTERM-64 uses CHECKSUM protocol.), the 'FILENAME' is the name that you have given your file and should be no longer than 8 characters and the '.TYP' is the file TYPE identifier that tells other users what the file is. (.TXT is a text file, .DOC is a documentation file. If the file you are sending is a program file for your computer you would use to identify it. This varies depending on how the SYSOP wants his system organized. Ask if you are not sure... (On the TIME--<X>--CHANGE (213) 329-3922 we use several for the Timex machines because some are for the TS-2068 and some are for the SPECTRUM and still others are for the TS-1000/1500.... To identify a program sent by SPECTERM-64 we use: 'filename.SPX' which means SPECTERM XMODEM... Now back to XMODEM.

After you hit <ENTER> as stated above XMODEM will identify it's self something like this:

AO>XMODEM RC FILENAME.TYP <-you entered this

XMODEM v11.7 - 09/08/85  
(Checksum protocol selected)  
Receiving B5:FILENAME.TYP  
3420K available for uploads  
File open - ready to receive  
To cancel: Ctrl-X, pause, Ctrl-X



NOW you should press your CAP-SHIFT and 1 keys (EDIT) then hit the 'T' key. XMODEM and SPECTERM-64 will now 'sync-up' and the transfer will take place AUTOMATICALLY... there is nothing else for you to do but wait... SPECTERM-64 will return you to TERMINAL MODE after the transfer is complete! If you are running SPECTERM-64 with the WC2050 Modem you will be lacking the capability to 'see' the transfer take place. SPECTERM-64 was written for use with an RS-232 interface and a 'stand-alone' modem, most of which have 'status' indicators that allow you to visually monitor the transfer of data.

To RECEIVE a file with XMODEM and SPECTERM-64 is done the same way except the commands are slightly different. For instance, to download the file you just uploaded you would do this:

First, you must get to the location of the file you want (this will vary depending on how the SYSOP has his or her system arranged) on the TIME<X>CHANGE you use the 'GOTO' command:

A0>GOTO UPLOADS (and hit <ENTER>)

B5> <-note the 'DRIVE & USER' has changed. If you wanted to see what files are here you would now enter the 'DIR' command but we are going for the one we just uploaded....

B5>XMODEM S FILENAME.TYP .....and hit <ENTER>  
XMODEM v11.7 - 09/08/85  
Sending: FILENAME.TYP  
File size: 64 records (8k)  
Send time: 1:20 at 1200 baud  
To cancel: Ctrl-X, pause, Ctrl-X

Now you press your CAP-SHIFT and 1 keys (EDIT) and hit the 'R' key. The 'R' in the upper-right corner of your screen will 'flash' on and off in sequence with each block of Data your system receives and SPECTERM will place you back into TERMINAL MODE after the transfer is complete. You now have data in the buffer and you should SAVE it to what ever medium you are employing.

Using 'KMD' is the SAME as XMODEM.

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DROPPING CHARACTERS when running at 1200 BAUD??????

This may happen on some systems!

The system you log on to USUALLY has a remedy just for this condition. As soon as the modem 'connects' some systems will ask you: "HOW MANY NULLS DO YOU NEED? (0-9):" If you experience randomly dropped (or lost) characters on your screen you should 'ask' for nulls. Again, depending on the software the SYSOP is running will determine where this command is located. Some systems have the "NULL SELECT" command in the main menu. Lost characters on the screen WILL NOT affect XMODEM transfers. How many should you choose? Well as many as you need. You should not need more than 5 or 6 nulls.

## Working with the WC-2050 MODEMS....

When using the WC-2050 modem with SPECTERM-64 you may experience a 'locked-keyboard' after a remote system has disconnected or dropped it's carrier (tones) with you. After logging-OFF of a remote system you should RETURN to BASIC (your 'LOCAL CONTROL MENU') and DISCONNECT the WC-2050. DO NOT type on the KEYBOARD except to bring-up the 'RETURN TO BASIC?' command and the 'Y' (yes) to exit TERMINAL MODE. If you type any other keys (two is all it takes) you will 'lock-up' the keyboard and be stuck in TERMINAL MODE! The only way out of this is to SHUT-OFF the computer and RE-LOAD SPECTERM. Or (this may or may not work with your phone) pick-up the phone you have connected to the WC-2050 and make a "noise" into the mouth piece. This will 'un-lock' the keyboard and you will re-gain control again.

For the hardware buff, here's the reason why....

The Westridge TS-2050 MODEM is a 'unique' specimen to say the least. It is 'logically' a UART (serial interface) with a 'dumb' modem attached. When a 'dumb' modem is 'off-line' (not receiving a carrier tone from the remote system) it 'tells' the UART so by the use of 'hand-shake' lines. If you were to look at a schematic or pin-out diagram of any UART you will find pins marked with names like 'DTR', 'RTS', 'CTS' ect... These are 'hand-shake' and control lines. When the WC-2050 is 'off-line' it pulls the 'CTS' line HIGH (a logic '1') to 'tell' the UART to "stop sending me Data, I'm BUSY" which the UART throws up a 'STATUS-FLAG' that 'tells' the computer to stop sending Data. SPECTERM-64 was written specifically for use with a SERIAL (RS-232) INTERFACE with a 'DUMB' or 'SMART' modem attached. The 'logical' difference between a 'normal stand-alone' DUMB modem and the WC-2050 is that when the DUMB modem is 'off-line' it still allows Data to be accepted from the UART even though it is not 'talking' to anything. Some dumb modems DO use the CTS line but these are the more expensive models that usually have 'self-test' modes with 'AL' and 'DL' (Analog and Digital 'loop-back') test modes. When in one of these 'test-modes' the modem pulls the CTS line 'LOW' thus allowing the Data sent TO the modem to be echoed back to the screen and the UART will not flag the computer to stop sending Data and "lock-up" the keyboard after the UART's 2-byte Data buffer is full.

### ONE STEP FURTHER....

If you are interested in what makes your WC-2050 really 'tic' here is where you will find it....  
For the MODEM portion of the WC-2050 contact

MOTOROLA SEMICONDUCTOR Products Inc.  
3501 Ed Bluestein Blvd.  
Austin, Texas 78721

And ask for APPLICATION NOTE AN-891

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To become a registered owner, simply complete and return the enclosed card to Grey & Clifford Computer Products. This card will allow us to advise you of product updates and new products.

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Grey & Clifford Computer Products have invested time and money to bring this SPECTERM-64 terminal software to the T/S2068 users. It is both unfair and illegal to make copies, other than for back-up. HOWEVER, if someone you know CANNOT wait to order a copy, send \$20.00 to G & C Computer Products along with the name and address of the new owner. This will allow us to keep all SPECTERM-64 users informed of new developments and "FAIR IS FAIR".

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SPECTERM-64

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ADDENDUM

For VERSION 4.0

This document amends the section titled:

"MICRODRIVES, DISC DRIVES and storage other than cassette:--"  
located on page #7 in the SPECTERM-64 manual. If you are using a  
mass storage system, (MICRODRIVE, DISC) the routine described  
below supplies SPECTERM with the information it needs to transmit  
a file that has been LOADED into the buffer from a source other  
than cassette. The XMODEM routine in SPECTERM needs to know the  
LENGTH of the file present in the BUFFER and where in the buffer  
it is located. Without this information SPECTERM will assume the  
buffer is 'empty' and will fail to transmit the contents of the  
buffer.

Poke the 'SUM value' of the LENGTH of your file + the BUFFER  
START ADDRESS into address locations 30816 and 30817  
(30817 is POKed with the "high byte" value) to be transmitted via  
XMODEM.

You can find the start of the buffer with the FN P(X) formula  
as described on page 7 in the SPECTERM-64 manual.

Below is an example of a routine that you could add to your  
"LOCAL CONTROL MENU" and customized to suit your mass storage  
system syntax.

EXAMPLE:

```
10 INPUT "Enter CODE LENGTH";CL
20 LET RCL=CL
30 IF INT(CL/128)<>CL/128 THEN LET CL=(INT(CL/128)+1)*128
40 LET HCL= INT ((CL+FN P(30814))/256)
50 LET LCL= (CL+FN P(30814))-HCL*256
60 LOAD [your system syntax]CODE FN P(30814)
70 POKE 30817,HCL:POKE 30816,LCL
80 IF CL>RCL THEN FOR F=34048+RCL TO 34048+CL:POKE F,0:NEXT F
90 GOTO 1500 <--- jump back to menu
```

HCL= "high byte" of the code length.

LCL= "low byte" of the code length.

ADDENDUM #v4.0-002 REV.A DECEMBER 5, 1986